DISCUSSION

EQUITABLE HYDRANT RENTALS AND BETTER METHODS FOR APPORTIONING FIRE PROTECTION COST

By Mr. John W. Alvord

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Mr. J. Davis Barnet: Mr. Alvord's paper is well in keeping with what has always appeared to the speaker the most interesting paper that was ever read before us, that of two years ago on "hydrant rental." But it seems to him that Mr. Alvord's formula would be more equitable had he used the area instead of the diameter and a lower figure for his constant. In working his figures out for a plant covering but 15,000 people it is evident that for a plant as small as that you would have to come up from one-half cent to five-eighths cent, if not three-fourths of a cent. The speaker does not wish to criticise Mr. Alvord, because he thinks he was justified in putting this simply before us and thus getting his formula into the shortest form in which it could be put; but from the slight analysis the speaker has made he thinks that squaring the diameter, using a lower constant (in the decimal point) and getting a higher figure in the answer would be necessary for most of us.

Mr. Oscar Bulkeley: Mr. Alvord, the author of this paper, makes the statement (see page 96) "The proper method of dividing the cost of public and private services is (1) to make a valuation of the plant; (2) to make a study of the value of a theoretical plant, sufficient in capacity for fire service only; and (3) a study of the

value of a theoretical plant, capable of domestic service only." Is this theoretical plant whose value is estimated to be one which will furnish the same measure or degree of fire protection as found in the existing plant under consideration? The actual plant may be, and quite often is, sadly inadequate for even reasonable fire protection. In such a case, probably, the author of the paper would improve the actual plant, in the case of a municipally owned water works, by means of a bond issue. In view of the exceeding reluctance on the part of many cities to issue bonds for any purpose, and the consequent necessity of depending upon the annual revenue to furnish the funds for making permanent improvements, the speaker has wondered if for purposes of rate making the theoretical plant might not in equity be one which would adequately serve the community and thus secure a greater income with which the plant can be gradually improved and the distribution system properly reinforced. The speaker being a young engineer, hesitates to comment upon a paper presented by Mr. Alvord, but does so because the question of how to build up a water works plant is so vital and so real.

MR. H. C. HODGKINS: The speaker would like to state an interesting fact which perhaps has escaped the attention of some of you. The first water plant that he was interested in was in the State of New York. Under the laws of the State at that time, its distribution pipes were classed as personal property, and the indebtedness was an offset against all the personal property. The assessment was somewhere between $50,000 and $60,000, but allowing for this offset under the statute, the result was that the taxes on the plant were $200. You can readily see that the returns to which the company would be entitled in the shape of rates would be somewhat different than if they had been paying taxes on all their property as real estate. At that time the Western Union Telegraph lines were the only property, over or through highways, that were considered real estate, and they were so classed by a special statute.

MR. A. A. REIMER: The speaker does not care to discuss Mr. Alvord's paper, but cannot, nevertheless, willingly pass by an opportunity to put in a word for the municipal plant which is getting nothing for its hydrants. He feels that those of us who are interested in municipal plants should take every opportunity we can to push along the idea of receiving a fair return for service rendered. We are placed

in an unfair position every time we are compared with a private concern that is in good hands. The feeling of this Association, both of those representing private interests and those representing municipal plants, should be to help along any movement that helps either of these interests.

Now some few plants in the country are receiving a fair return, or a partial return for the services rendered, in this line; but before you can compare one system with another you must know that the conditions are the same in order to get a fair comparison. In order to find out what we are putting into our "Charity Fund" as we facetiously label it at home, the speaker made the calculation which was referred to in Mr. Alvord's paper of designing a system to furnish fire protection. He did this some three or four years ago, and found that it would cost us about $26 for every hydrant that we had in service in the city. That figure is somewhat lessened now by the increase in the number of hydrants, but we will soon be obliged to have a larger system in order to get that additional fire protection which must of necessity come in a comparatively short time.

MR. ALBERT BLAUVELT: Mr. Alvord refers to a municipal water works with cost of operation estimated separately as if solely for private fire service and the same estimated as if solely for public service. It would be interesting to know what would result by combining the two estimates that he mentions and after such combination make two additional estimates. One estimate to show cost of operation of the water works with pressure service on, all hands on duty, coal coming off of the coal pile but with no water being used or drawn, that is to say, the pumps would be moving only because of leakage and slippage. The second estimate to be the same but with any addition needed to account for normal use or consumption of water. The speaker begs to ask Mr. Alvord whether he has any such figures.

MR. JOHN W. ALVORD: That is precisely the problem which you have to solve. You must estimate the cost of two different plants in order to get the ratio between fire and domestic service. You have a plant before you to be valued, and you first of all assume that that plant is built to furnish fire protection only, in which case it is there ready to serve but not operating 99 per cent of the time, the engines are warmed up, the pumps turned over once in a while,

and everything in readiness for a fire; under these conditions you calculate your operating expenses, and you calculate the cost of the pipe system and the pumps on a fire service basis; then you make a comparison of this strictly fire service plant with a strictly domestic service plant in which you do not have to furnish fire service, but do furnish water for domestic consumption only, and that gives you the ratio which you can apply to the two combined services of the plant under consideration, with its known value. Does this make it clear?

MR. ALBERT BLAUVELT: Yes, the meaning is clear; however, it may be useful to develop the thought the speaker has endeavored to suggest. One of the difficulties that you gentlemen have is that the public is more or less under the impression that if and when water is not being used it does not then cost the water works anything for domestic service or for fire protection. If it can be shown to the public that it costs a water works as much or more for "stand by service" as for "flow service" it may thereby be possible to show the public that the "stand by service" must invariably be reckoned for payment. In arguments for charges for water for fire department use the speaker believes that material aid can be gained by developing the truth of the cost of the "stand by service" as an offset to the people who claim that fire protection service costs nothing at such times as water is not being used.

MR. W. C. HAWLEY: There is an interesting point that the speaker overlooked, and that is the effect on the quality of fire protection provided in the municipalities that have now come under the new scheme. The first municipality that we made a contract with at once increased its hydrants from 34 to 50. The second at once increased from 31 to 50; so it has been with all those that have made new contracts. The last one has ordered 150 more hydrants, whereas at present it has 137. That means a great improvement in the quality of the fire protection, because of the added number of hydrants which would not have been set before because every hydrant meant so many dollars a year.

MR. JOHN W. ALVORD: Perhaps the author may be able to throw some light on some of the suggestions that have been made. Mr. Chester has made a direct application of some figures given as a

tentative conclusion in the illustration in the paper to a number of his own plants with which he is familiar and which probably have quite different conditions; but it must be remembered that this is not a mathematical demonstration or a final conclusion expressed in figures; it is a description of a fundamental principle; and all that has been attempted in the paper is to illustrate that fundamental principle with one example which has been actually worked out. Undoubtedly the principle properly applied will work out very differently as to its mathematical results, when applied to any other set of conditions on another plant. The author doubts if anybody in this Association has more frequently reiterated that we ought not to apply figures applicable to one plant indiscriminately to another plant than has my good friend Mr. Chester.

Mr. Barnet of course correctly raises a theoretically valid objection that the ratio is not perfect; and that must be admitted promptly. The paper states:

> It is true that the cost and capacity of mains increase at a rate greater than the first power of the diameter. The capacity increases as the square of the diameter, and the cost between the first power and the square. If the cost of the mains is increased by replacement and cost of cutting through pavements, the adjustment of cost as between different diameters will be closer.

But it is desirable in all these determinations and in all these methods to get simplicity. It might be desirable, under some conditions (and there is no objection to it if anybody wants to do it), to introduce a rule that would be mathematically exact and thus more accurate than the one suggested; but it would not be so simple. If we can accomplish anything by increased mathematical exactness, well and good; but practically the rule suggested is the simpler way and will not lead to any incorrect results.

Mr. Hawley mentioned a difficulty that might arise as between three contiguous cities, using the same feeder main from a reservoir. The author does not apprehend that there would be any difficulty in adjusting rates under those conditions especially if we could adjust rates in all of the three cities at the same time, because we can certainly apportion the capacity of the main to the three cities individually, either in proportion to their consumption, or population, or any other way that would seem fair; and then rate them in accordance with that division. The main advantage of the method proposed is that it permits a city having an adequate pipe distribution

system to pay fire protection rental in proportion. It eliminates that uncomfortable problem which arises through extending distribution pipes out into the outskirts of a city by reason of the fact that ordinary hydrant rentals are a flat rate and therefore inordinately high on the outskirts of a town, in proportion to the service. That is the great cause of criticism of the incongruous flat hydrant rate.

MR. OSCAR BULKELEY: Mr. Alvord did not say whether that theoretical plant was supposed to equal in measure of efficiency the existing plant that he was attempting to compare with it.

MR. JOHN W. ALVORD: On the one hand you are hypothetically remodeling your plant to serve your domestic consumption, which of course means that you do not have to have such large distribution pipes and not quite so much pump capacity, nor so much water available for sudden emergencies as you need to have for fire protection, but in every other way keeping close to the model plant before you that you are fixing rates for. Then you turn around and hypothetically remodel it for a strictly fire protection proposition, which of course means keeping your pipe system exactly as good as it should be under present conditions and providing sufficient pumping power. Then you go through the same hypothetical examination with the operating expense, which as Mr. Blauvelt has pointed out is, in the case of a fire protection system, a stand-by proposition, on the one hand, and on the other hand a constant pumping proposition for domestic consumption alone. These two results, correctly worked out, give you the ratios which you can use to divide the real operating cost correctly; that is to say, the costs on your actual plant as between fire protection and domestic consumption. Now the point that you raise, it seems to the author, has more to do with the question of financing extensions. It seems to him that is rather outside of the question before us. Of course that is always a problem in every city, to raise the proper proportion of moneys for public use and fire protection; but the point raised here is that most of our cities are not paying what they ought to pay for the fire protection service when the matter is carefully examined.

MR. OSCAR BULKELEY: That was the point that rose in the speaker's mind, the fact that the existing plant may be inadequate.

Now if the existing plant is inadequate by $200,000 or $300,000 of needed reinforcement to the distribution system, should not this inadequacy be taken care of when making the rates by considering the theoretical plant to be of proper size and such as to give good service?

MR. JOHN W. ALVORD: In that case if you were adjusting the whole subject of new improvements and new rates, you can very readily estimate the new construction that is necessary to provide for a given state of efficiency for a given population.